

Molecular Biology

PHYLOGENETIC ANALYSIS OF *APIS* (HONEY BEES) FROM TURKEY AND USA USING MITOCHONDRIAL CYTOCHROME OXIDASE I GENE SITE.

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There is much diversity among the different species of *Apis* (honey bees).

Diversity is not only seen among the different species but also among the different subspecies which gives rise to many haplotypes. These haplotypes have a global distribution and are not limited to a single location. It is also essential to mention that a great amount of heterogeneity is observed among the bees from different hives within the same location. Bees from Turkey and Tulsa, USA were studied to establish the molecular phylogenetic relationships among them. The bees from Turkey were from areas along the coast of the Black Sea.

The mitochondrial CO I site of the Turkish bees were compared to that of the bees from Tulsa. The CO I site was amplified using PCR and the amplified DNA was purified. The two complementary strands of the DNA in the purified PCR product were further amplified separately using A and B primers in separate reactions. The amplified strands were then sequenced. The sequences of the two complementary strands for each sample were used to obtain a contingent in the sequencer program. These contingents and similar sequences obtained from a blast search at the NIH website were exported into McClade. The saved McClade file was then exported into Clustal to give aligned data.

PAUP* was used to construct a neighbor joining tree, bootstrap tree and a distance matrix for all the available aligned data.

The object of the research was to study the variation seen among bees from Turkey and Tulsa, the geographic distribution of different mtDNA haplotypes within the *Apis mellifera* species, to verify whether the mtDNA data supports the validity of species and subspecies recognized based on their morphology and ultimately answer the question: “What are the phylogenetic relationships among these mitochondrial haplotypes?”

The alignments for the gene sequences showed some ambiguities. Several gaps were introduced due to either a single base substitution or deletion. There was very little variation between the bees from Turkey and Tulsa. Much heterogeneity was observed among different hives within the same location.